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Clip Migration after 11-gauge Vacuum-assisted Stereotactic Biopsy: Case Report¹

A 68-year-old woman underwent stereotactic biopsy of a small cluster of calcifications. The postbiopsy mammograms showed the biopsy-marking clip to be located correctly at the biopsy site. Follow-up mammograms 1 year later showed that the clip migrated to another quadrant of the breast. Findings in this case demonstrate that at long-term follow-up a biopsy-marking clip may not be accurately marking the biopsy site.

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Biopsy-marking clips ideally should mark biopsy sites accurately. However, incorrect location of the clip immediately after biopsy can occur owing to the "accretion effect." In the case we report here, findings showed that the clip migrated after the immediate postbiopsy period. Since clip migration can affect interpretation of mammographic findings and localization for future surgery, the radiologist should not assume that the clip is correctly located at the biopsy site. The radiologist should compare prebiopsy, postbiopsy, and follow-up mammograms to determine whether the biopsy-marking clip has moved.

Case Report

We received approval from our Human Investigation Committee for Medical Record Review; informed consent was not required.

At mammography, a 68-year-old woman had a small cluster of calcifications at the 10- to 11-o'clock position in the posterior third of the right breast. Stereotactic core biopsy was performed from a superior approach in the craniocaudal projection

with an 11-gauge vacuum-assisted suction device (Mammotome; Biopsy/Ethicon-Endosurgery, Cincinnati, Ohio). Since most of the calcifications were removed, a biopsy-marking clip (MicroMark; Biopsy/Ethicon-Endosurgery) was deployed. Our method of clip deployment is to withdraw the probe 3-5 mm, to insert the introducer, and to deploy the clip while the vacuum is simultaneously applied. The postprocedural digital stereotactic images demonstrated the presence of the clip in the air-filled biopsy cavity. The postbiopsy craniocaudal and mediolateral mammograms showed the clip accurately located at the site where samples of calcifications were removed (Fig 1). There were no complications. In particular, no excessive bleeding occurred during the biopsy. The histologic results were benign.

At routine mammographic follow-up 1 year later, a small scar at the biopsy site and a few residual calcifications were noted (Fig 2). The biopsy-marking clip, however, was no longer located at the biopsy site but was in the inferior aspect of the breast. Since the clip was at the correct site following the procedure, migration must have occurred at some time after the postprocedure mammograms were obtained.

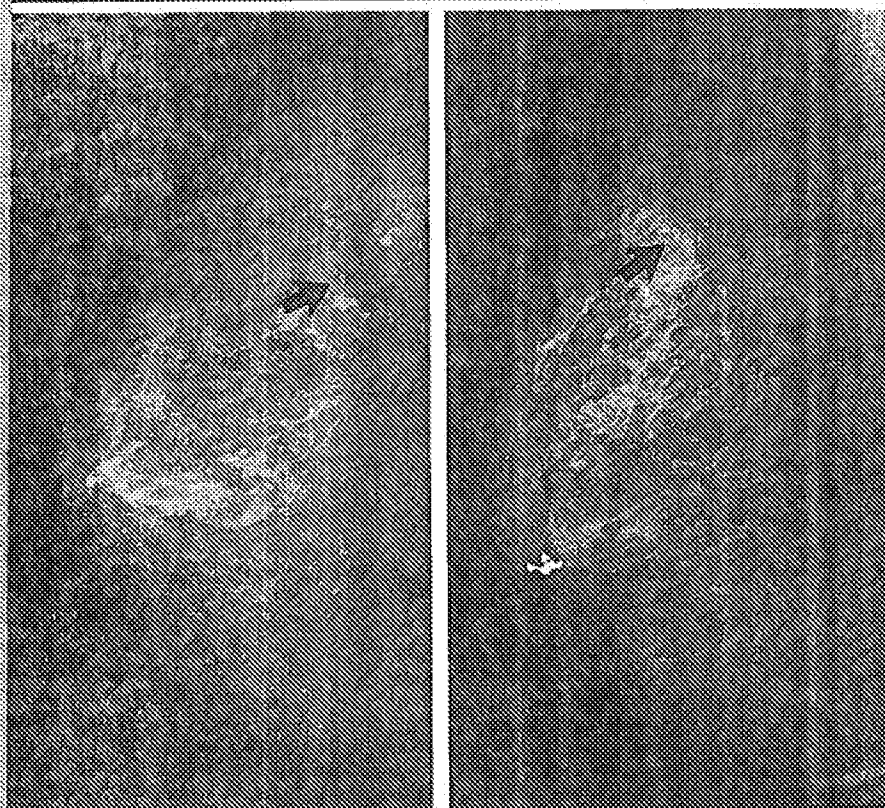
Discussion

The use of the 11-gauge vacuum suction device can result in complete removal of a mammographic abnormality. For small lesions, a biopsy-marking clip is available to localize the site of biopsy for subsequent surgery if necessary. While findings reported in articles (1-5) about this procedure have shown the clip to be in close proximity to the biopsy site in the majority of cases, it is known that the final location of the clip can be at remote

Author contributions:

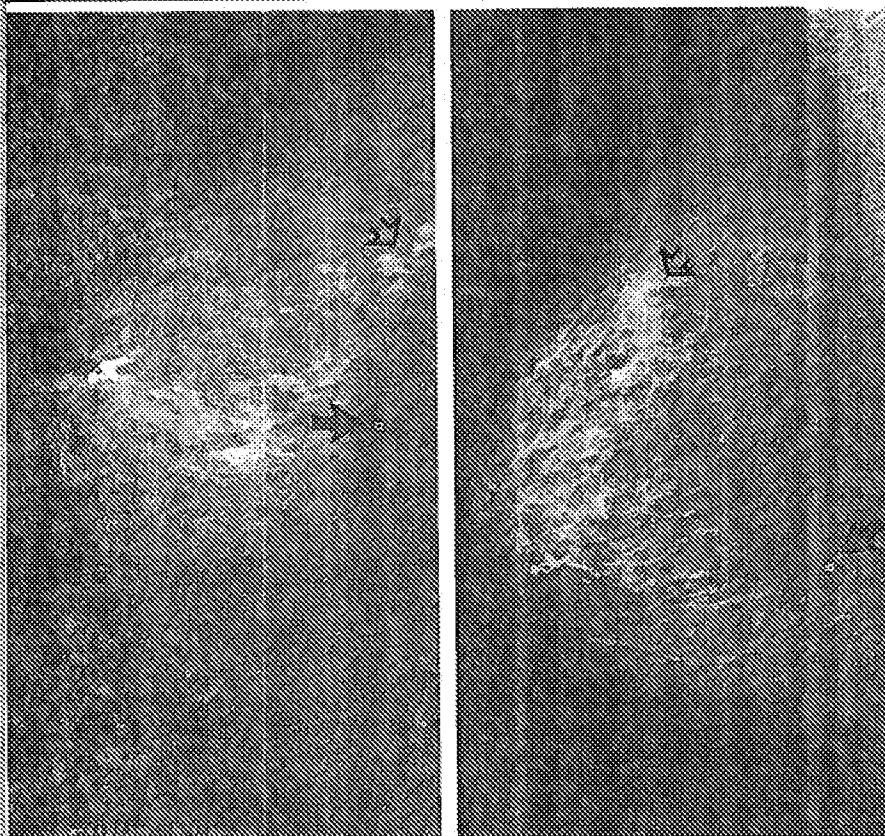
Guarantors of integrity of entire study, L.E.P., C.H.L.; study concepts and design, L.E.P.; literature research, L.E.P.; clinical studies, L.E.P.; data acquisition and analysis/interpretation, L.E.P.; manuscript preparation, L.E.P., C.H.L.; manuscript definition of intellectual content, L.E.P.; manuscript editing, revision/review, and final version approval, L.E.P., C.H.L.

Figure 1. (a) Craniocaudal and (b) mediolateral postprocedural mammograms show the clip (arrow) accurately located at the biopsy site. Almost all of the calcifications were removed. Results of histologic analysis showed that the calcifications were benign.



b.

Figure 2. (a) Craniocaudal and (b) mediolateral oblique images obtained 1 year after the biopsy show the clip (solid arrow) in the inferior aspect of the breast. A small scar and a few residual calcifications are at the previous biopsy site (open arrow).



b.

sites, several centimeters or more from the area of sampling in some cases. Since the clip is deployed at the termination of the stereotactic procedure while the breast remains in compression, release from compression can result in a change in the location of the clip to a position either proximal or distal to the biopsy cavity, along the z axis of the needle track (accordion effect). Furthermore, if the clip is not firmly attached to breast tissue when deployed, bleeding can cause the clip to travel through the needle track and even out of the breast (6). For these reasons, postprocedural mammograms are advocated to document the relationship of the clip to the biopsy site (4).

In this case, although the postbiopsy mammograms showed the clip to be located correctly at the site where samples of calcifications were removed, subsequent mammograms 1 year later revealed the clip to be markedly displaced. The exact mechanism and timing of the displacement are not known. On review of the digital image obtained after clip deployment, the clip was in a dependent portion of the cavity, possibly indicating poor adherence to tissue. Applying the vacuum suction while the clip is deployed should, theoretically, allow the clip to adhere to tissue rather than to be free floating in the biopsy cavity. Despite good technique, however, the clip may

not always be firmly attached. Although there was no hematoma formation or history of postprocedural bleeding in this case, it is possible that the clip migrated within the patent needle track soon after the procedure.

An alternative explanation is that the clip freely migrated within the predominantly fatty tissue of the breast. Wires used for needle localization prior to surgery have been reported (7,8) to migrate within the breast and to remote areas of the body. If the case presented here represents similar migration, then biopsy-marking clips may have the potential to migrate some distances within or away from the breast.

Burbank and Forcier (3) have shown long-term stability (mean follow-up time, 8.6 months) of the localizing clip in 31 cases. No measurable movement over time was noted. Longer follow-up times have not been reported. Findings in our case demonstrate that clip migration after postbiopsy imaging is possible, and the position of the clip on subsequent mammograms, therefore, may not be accurate and reliable for future documentation of the biopsy site. This has important implications for subsequent localization for surgery and for interpretation of follow-up mammograms. Radiologists who perform needle localizations or who interpret mammograms after stereotactic core bi-

opsies in which a clip was placed should not assume that the clip is in the correct location and should always review prebiopsy mammograms.

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